

SEQUENCE LISTING

<110> Nemerow, Glen R.
Li, Erguang

<120> BIFUNCTIONAL MOLECULES AND VECTORS COMPLEXED THEREWITH FOR TARGETED
GENE DELIVERY

<130> 22908-1228

<140> Herewith

<141> 2001-07-10

<150> converted to a provisional from 09/613,017)

<151> 2000-07-10

<160> 33

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 1516

<212> DNA

<213> Mouse

<220>

<221> CDS

<222> (28)...(1395)

<223> DAV-1 heavy chain, penton base monoclonal antibody

<400> 1

cagacactga acacactgac tctaacc atg gga tgg agc tgg atc ttt ctc ttc 54
Met Gly Trp Ser Trp Ile Phe Leu Phe
1 5

ctc ctg tca gga act gca ggc gtc cac tct gag gtc cag ctt cag cag 102
Leu Leu Ser Gly Thr Ala Gly Val His Ser Glu Val Gln Leu Gln Gln
10 15 20 25

tca gga cct gag ctg gtg aaa cct ggg gcc tca gtg aag ata tcc tgc 150
Ser Gly Pro Glu Leu Val Lys Pro Gly Ala Ser Val Lys Ile Ser Cys
30 35 40

aag gct tct gga tac aca ttc act gac tac aac atg cac tgg gtg aag 198
Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr Asn Met His Trp Val Lys
45 50 55

cag agc cat gga aag agc ctt gag tgg att gga tat att tat cct tac 246
Gln Ser His Gly Lys Ser Leu Glu Trp Ile Gly Tyr Ile Tyr Pro Tyr
60 65 70

aaa ggt ggt act ggc tac aac cag aag ttc aag agc aag gcc aca ttg 294
Lys Gly Gly Thr Gly Tyr Asn Gln Lys Phe Lys Ser Lys Ala Thr Leu
75 80 85

aca aca gac agt tcc tcc aac aca gcc tac atg gag ctc cgc agc ctg 342
Thr Thr Asp Ser Ser Ser Asn Thr Ala Tyr Met Glu Leu Arg Ser Leu
90 95 100 105

aca tct gat gcc tct gca gtc tat tac tgt gca aga ggg att gct tac 390
Thr Ser Asp Ala Ser Ala Val Tyr Tyr Cys Ala Arg Gly Ile Ala Tyr
110 115 120

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<210> 2
<211> 456
<212> PRT
<213> Mouse
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<220>
<221> PEPTIDE
<222> (0)...(0)
<223> DAV-1 heavy chain, penton base monoclonal antibody
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Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Pro Ser Ser Thr Trp Pro
 195 200 205
 Ser Glu Thr Val Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys
 210 215 220
 Val Asp Lys Lys Ile Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile
 225 230 235 240
 Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro
 245 250 255
 Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val
 260 265 270
 Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val
 275 280 285
 Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln
 290 295 300
 Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met His Gln
 305 310 315 320
 Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala
 325 330 335
 Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro
 340 345 350
 Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala
 355 360 365
 Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu
 370 375 380
 Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr
 385 390 395 400
 Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr
 405 410 415
 Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe
 420 425 430
 Ile Cys Ser Val Leu His Glu Gly Leu His Asn His His Thr Glu Lys
 435 440 445
 Ser Leu Ser His Ser Pro Gly Lys
 450 455

<210> 3
 <211> 831
 <212> DNA
 <213> Mouse

<220>
 <221> CDS
 <222> (13)...(726)
 <223> DAV-1 light chain, penton base monoclonal antibody

<400> 3
 aagcttaccg cc atg gag aca gac aca atc ctg cta tgg gtg ctg ctg ctc 51
 Met Glu Thr Asp Thr Ile Leu Leu Trp Val Leu Leu Leu
 1 5 10
 tgg gtt cca ggc tcc act ggt gac att gtg ctg acc caa tct cca gct 99
 Trp Val Pro Gly Ser Thr Gly Asp Ile Val Leu Thr Gln Ser Pro Ala
 15 20 25
 tct ttg gct gtg tct cta ggg cag agg gcc acc atc tcc tgc aag gcc 147
 Ser Leu Ala Val Ser Leu Gly Gln Arg Ala Thr Ile Ser Cys Lys Ala
 30 35 40 45
 agc caa agt gtt gat tat gat ggt gat agt tat atg aac tgg tac caa 195
 Ser Gln Ser Val Asp Tyr Asp Gly Asp Ser Tyr Met Asn Trp Tyr Gln
 50 55 60

cag aaa cca gga cag cca ccc aaa ctc ctc atc tat gct gca tcc aat 243
 Gln Lys Pro Gly Gln Pro Pro Lys Leu Leu Ile Tyr Ala Ala Ser Asn
 65 70 75

tta gaa tct ggg atc cca gcc agg ttt agt ggc agt ggg tct ggg aca 291
 Leu Glu Ser Gly Ile Pro Ala Arg Phe Ser Gly Ser Gly Ser Gly Thr
 80 85 90

gac ttc acc ctc aac atc cat cct gtg gag gag gag gat gct gca acc 339
 Asp Phe Thr Leu Asn Ile His Pro Val Glu Glu Glu Asp Ala Ala Thr
 95 100 105

tat tac tgt cag caa act aat gag gat ccg tgg acg ttc ggt gga ggc 387
 Tyr Tyr Cys Gln Gln Thr Asn Glu Asp Pro Trp Thr Phe Gly Gly Gly
 110 115 120 125

acc aag ctg gaa atc aaa cgg gct gat gct gca cca act gta tcc atc 435
 Thr Lys Leu Glu Ile Lys Arg Ala Asp Ala Ala Pro Thr Val Ser Ile
 130 135 140

ttc cca cca tcc agt gag cag tta aca tct gga ggt gcc tca gtc gtg 483
 Phe Pro Pro Ser Ser Glu Gln Leu Thr Ser Gly Gly Ala Ser Val Val
 145 150 155

tgc ttc ttg aac aac ttc tac ccc aaa gac atc aat gtc aag tgg aag 531
 Cys Phe Leu Asn Asn Phe Tyr Pro Lys Asp Ile Asn Val Lys Trp Lys
 160 165 170

att gat ggc agt gaa cga caa aat ggc gtc ctg aac agt tgg act gat 579
 Ile Asp Gly Ser Glu Arg Gln Asn Gly Val Leu Asn Ser Trp Thr Asp
 175 180 185

cag gac agc aaa gac agc acc tac agc atg agc agc acc ctc acg ttg 627
 Gln Asp Ser Lys Asp Ser Thr Tyr Ser Met Ser Ser Thr Leu Thr Leu
 190 195 200 205

acc aag gac gag tat gaa cga cat aac agc tat acc tgt gag gcc act 675
 Thr Lys Asp Glu Tyr Glu Arg His Asn Ser Tyr Thr Cys Glu Ala Thr
 210 215 220

cac aag aca tca act tca ccc att gtc aag agc ttc aac agg aat gag 723
 His Lys Thr Ser Thr Ser Pro Ile Val Lys Ser Phe Asn Arg Asn Glu
 225 230 235

tgt tagagacaaa ggtcctgaga cgccaccacc agctccccag ctccatccta 776
 Cys

tcttcccttc taaggtcttg gaggttccct cgagcggtaa agggcgaatt ccage 831

<210> 4
 <211> 238
 <212> PRT
 <213> Mouse

<220>
 <221> PEPTIDE
 <222> (0)...(0)
 <223> DAV-1 light chain, penton base monoclonal antibody

<400> 4
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1 5 10 15
 Gly Ser Thr Gly Asp Ile Val Leu Thr Gln Ser Pro Ala Ser Leu Ala
 20 25 30
 Val Ser Leu Gly Gln Arg Ala Thr Ile Ser Cys Lys Ala Ser Gln Ser
 35 40 45
 Val Asp Tyr Asp Gly Asp Ser Tyr Met Asn Trp Tyr Gln Gln Lys Pro
 50 55 60
 Gly Gln Pro Pro Lys Leu Ile Tyr Ala Ala Ser Asn Leu Glu Ser
 65 70 75 80
 Gly Ile Pro Ala Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
 85 90 95
 Leu Asn Ile His Pro Val Glu Glu Glu Asp Ala Ala Thr Tyr Tyr Cys
 100 105 110
 Gln Gln Thr Asn Glu Asp Pro Trp Thr Phe Gly Gly Gly Thr Lys Leu
 115 120 125
 Glu Ile Lys Arg Ala Asp Ala Ala Pro Thr Val Ser Ile Phe Pro Pro
 130 135 140
 Ser Ser Glu Gln Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu
 145 150 155 160
 Asn Asn Phe Tyr Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly
 165 170 175
 Ser Glu Arg Gln Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser
 180 185 190
 Lys Asp Ser Thr Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp
 195 200 205
 Glu Tyr Glu Arg His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr
 210 215 220
 Ser Thr Ser Pro Ile Val Lys Ser Phe Asn Arg Asn Glu Cys
 225 230 235

<210> 5
 <211> 1314
 <212> DNA
 <213> Mouse

<220>
 <221> CDS
 <222> (0)...(1314)
 <223> Portion of DAV-1 heavy chain used for fusion protein
 bifunctional antibody

<400> 5
 atg gga tgg agc tgg atc ttt ctc ttc ctc ctg tca gga act gca ggc 48
 Met Gly Trp Ser Trp Ile Phe Leu Phe Leu Ser Gly Thr Ala Gly
 1 5 10 15
 gtc cac tct gag gtc cag ctt cag cag tca gga cct gag ctg gtg aaa 96
 Val His Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys
 20 25 30
 cct ggg gcc tca gtg aag ata tcc tgc aag gct tct gga tac aca ttc 144
 Pro Gly Ala Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe
 35 40 45
 act gac tac aac atg cac tgg gtg aag cag agc cat gga aag agc ctt 192
 Thr Asp Tyr Asn Met His Trp Val Lys Gln Ser His Gly Lys Ser Leu
 50 55 60
 gag tgg att gga tat att tat cct tac aaa ggt ggt act ggc tac aac 240
 Glu Trp Ile Gly Tyr Ile Tyr Pro Tyr Lys Gly Gly Thr Gly Tyr Asn
 65 70 75 80

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Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala
 325 330 335
 ttc cct gcc ccc atc gag aaa acc atc tcc aaa acc aaa ggc aga ccg 1056
 Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro
 340 345 350
 aag gct cca cag gtg tac acc att cca cct ccc aag gag cag atg gcc 1104
 Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala
 355 360 365
 aag gat aaa gtc agt ctg acc tgc atg ata aca gac ttc ttc cct gaa 1152
 Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu
 370 375 380
 gac att act gtg gag tgg cag tgg aat ggg cag cca gcg gag aac tac 1200
 Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr
 385 390 395 400
 aag aac act cag ccc atc atg gac aca gat ggc tct tac ttc gtc tac 1248
 Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr
 405 410 415
 agc aag ctc aat gtg cag aag agc aac tgg gag gca gga aat act ttc 1296
 Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe
 420 425 430
 atc tgc tct gtg tta cat 1314
 Ile Cys Ser Val Leu His
 435

<210> 6

<211> 438

<212> PRT

<213> Mouse

<220>

<221> PEPTIDE

<222> (0)...(0)

<223> Portion of DAV-1 heavy chain used for fusion protein
bifunctional antibody

<400> 6

Met Gly Trp Ser Trp Ile Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly
 1 5 10 15
 Val His Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys
 20 25 30
 Pro Gly Ala Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe
 35 40 45
 Thr Asp Tyr Asn Met His Trp Val Lys Gln Ser His Gly Lys Ser Leu
 50 55 60
 Glu Trp Ile Gly Tyr Ile Tyr Pro Tyr Lys Gly Gly Thr Gly Tyr Asn
 65 70 75 80
 Gln Lys Phe Lys Ser Lys Ala Thr Leu Thr Thr Asp Ser Ser Ser Asn
 85 90 95
 Thr Ala Tyr Met Glu Leu Arg Ser Leu Thr Ser Asp Ala Ser Ala Val
 100 105 110
 Tyr Tyr Cys Ala Arg Gly Ile Ala Tyr Trp Gly Gln Gly Thr Leu Val
 115 120 125
 Thr Val Ser Ala Ala Lys Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala
 130 135 140

Pro Gly Ser Ala Ala Gln Thr Asn Ser Met Val Thr Leu Gly Cys Leu
 145 150 155 160
 Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Val Thr Trp Asn Ser Gly
 165 170 175
 Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Asp
 180 185 190
 Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Pro Ser Ser Thr Trp Pro
 195 200 205
 Ser Glu Thr Val Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys
 210 215 220
 Val Asp Lys Lys Ile Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile
 225 230 235 240
 Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro
 245 250 255
 Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val
 260 265 270
 Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val
 275 280 285
 Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln
 290 295 300
 Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met His Gln
 305 310 315 320
 Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala
 325 330 335
 Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro
 340 345 350
 Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala
 355 360 365
 Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu
 370 375 380
 Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr
 385 390 395 400
 Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr
 405 410 415
 Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe
 420 425 430
 Ile Cys Ser Val Leu His
 435

<210> 7
 <211> 157
 <212> PRT
 <213> Human

<220>
 <221> PEPTIDE
 <222> (0)...(0)
 <223> Tumor necrosis factor-alpha (TNF alpha, mature peptide)

<400> 7
 Val Arg Ser Ser Ser Arg Thr Pro Ser Asp Lys Pro Val Ala His Val
 1 5 10 15
 Val Ala Asn Pro Gln Ala Glu Gly Gln Leu Gln Trp Leu Asn Arg Arg
 20 25 30
 Ala Asn Ala Leu Leu Ala Asn Gly Val Glu Leu Arg Asp Asn Gln Leu
 35 40 45
 Val Val Pro Ser Glu Gly Leu Tyr Leu Ile Tyr Ser Gln Val Leu Phe
 50 55 60
 Lys Gly Gln Gly Cys Pro Ser Thr His Val Leu Thr His Thr Ile
 65 70 75 80

Ser Arg Ile Ala Val Ser Tyr Gln Thr Lys Val Asn Leu Leu Ser Ala
 85 90 95
 Ile Lys Ser Pro Cys Gln Arg Glu Thr Pro Glu Gly Ala Glu Ala Lys
 100 105 110
 Pro Trp Tyr Glu Pro Ile Tyr Leu Gly Gly Val Phe Gln Leu Glu Lys
 115 120 125
 Gly Asp Arg Leu Ser Ala Glu Ile Asn Arg Pro Asp Tyr Leu Asp Phe
 130 135 140
 Ala Glu Ser Gly Gln Val Tyr Phe Gly Ile Ile Ala Leu
 145 150 155

<210> 8
 <211> 70
 <212> PRT
 <213> Human

<220>
 <221> PEPTIDE
 <222> (0)...(0)
 <223> Human Insulin-like Growth Factor 1 sequence
 (IGF-1, mature peptide)

<400> 8
 Gly Pro Glu Thr Leu Cys Gly Ala Glu Leu Val Asp Ala Leu Gln Phe
 1 5 10 15
 Val Cys Gly Asp Arg Gly Phe Tyr Phe Asn Lys Pro Thr Gly Tyr Gly
 20 25 30
 Ser Ser Ser Arg Arg Ala Pro Gln Thr Gly Ile Val Asp Glu Cys Cys
 35 40 45
 Phe Arg Ser Cys Asp Leu Arg Arg Leu Glu Met Tyr Cys Ala Pro Leu
 50 55 60
 Lys Pro Ala Lys Ser Ala
 65 70

<210> 9
 <211> 53
 <212> PRT
 <213> Human

<220>
 <221> PEPTIDE
 <222> (0)...(0)
 <223> Epidermal Growth Factor (EGF, mature peptide)

<400> 9
 Asn Ser Asp Ser Glu Cys Pro Leu Ser His Asp Gly Tyr Cys Leu His
 1 5 10 15
 Asp Gly Val Cys Met Tyr Ile Glu Ala Leu Asp Lys Tyr Ala Cys Asn
 20 25 30
 Cys Val Val Gly Tyr Ile Gly Glu Arg Cys Gln Tyr Arg Asp Leu Lys
 35 40 45
 Trp Trp Glu Leu Arg
 50

<210> 10
 <211> 164
 <212> PRT
 <213> Human

<220>
 <221> PEPTIDE
 <222> (0)...(0)

090333Z 071001

<400> 10

<210> 11

<212> PRT

<213> Art

 $\langle 220 \rangle$

<400> 11

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Ser Glu Thr Val Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys
 210 215 220
 Val Asp Lys Lys Ile Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile
 225 230 235 240
 Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro
 245 250 255
 Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val
 260 265 270
 Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val
 275 280 285
 Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln
 290 295 300
 Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met His Gln
 305 310 315 320
 Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala
 325 330 335
 Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro
 340 345 350
 Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Lys Glu Gln Met Ala
 355 360 365
 Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu
 370 375 380
 Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr
 385 390 395 400
 Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr
 405 410 415
 Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe
 420 425 430
 Ile Cys Ser Val Leu His Glu Phe Val Arg Ser Ser Ser Arg Thr Pro
 435 440 445
 Ser Asp Lys Pro Val Ala His Val Val Ala Asn Pro Gln Ala Glu Gly
 450 455 460
 Gln Leu Gln Trp Leu Asn Arg Arg Ala Asn Ala Leu Leu Ala Asn Gly
 465 470 475 480
 Val Glu Leu Arg Asp Asn Gln Leu Val Val Pro Ser Glu Gly Leu Tyr
 485 490 495
 Leu Ile Tyr Ser Gln Val Leu Phe Lys Gly Gln Gly Cys Pro Ser Thr
 500 505 510
 His Val Leu Leu Thr His Thr Ile Ser Arg Ile Ala Val Ser Tyr Gln
 515 520 525
 Thr Lys Val Asn Leu Leu Ser Ala Ile Lys Ser Pro Cys Gln Arg Glu
 530 535 540
 Thr Pro Glu Gly Ala Glu Ala Lys Pro Trp Tyr Glu Pro Ile Tyr Leu
 545 550 555 560
 Gly Gly Val Phe Gln Leu Glu Lys Gly Asp Arg Leu Ser Ala Glu Ile
 565 570 575
 Asn Arg Pro Asp Tyr Leu Asp Phe Ala Glu Ser Gly Gln Val Tyr Phe
 580 585 590
 Gly Ile Ile Ala Leu
 595

<210> 12
 <211> 510
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Fusion protein with N-terminal portion of DAV-1 heavy chain
 and IGF-1 mature peptide

<400> 12
 Met Gly Trp Ser Trp Ile Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly

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 Val His Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys
 20 25 30
 Pro Gly Ala Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe
 35 40 45
 Thr Asp Tyr Asn Met His Trp Val Lys Gln Ser His Gly Lys Ser Leu
 50 55 60
 Glu Trp Ile Gly Tyr Ile Tyr Pro Tyr Lys Gly Gly Thr Gly Tyr Asn
 65 70 75 80
 Gln Lys Phe Lys Ser Lys Ala Thr Leu Thr Thr Asp Ser Ser Ser Asn
 85 90 95
 Thr Ala Tyr Met Glu Leu Arg Ser Leu Thr Ser Asp Ala Ser Ala Val
 100 105 110
 Tyr Tyr Cys Ala Arg Gly Ile Ala Tyr Trp Gly Gln Gly Thr Leu Val
 115 120 125
 Thr Val Ser Ala Ala Lys Thr Thr Pro Pro Ser Val Tyr Pro Leu Ala
 130 135 140
 Pro Gly Ser Ala Ala Gln Thr Asn Ser Met Val Thr Leu Gly Cys Leu
 145 150 155 160
 Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Val Thr Trp Asn Ser Gly
 165 170 175
 Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Asp
 180 185 190
 Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Pro Ser Ser Thr Trp Pro
 195 200 205
 Ser Glu Thr Val Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys
 210 215 220
 Val Asp Lys Lys Ile Val Pro Arg Asp Cys Gly Cys Lys Pro Cys Ile
 225 230 235 240
 Cys Thr Val Pro Glu Val Ser Ser Val Phe Ile Phe Pro Pro Lys Pro
 245 250 255
 Lys Asp Val Leu Thr Ile Thr Leu Thr Pro Lys Val Thr Cys Val Val
 260 265 270
 Val Asp Ile Ser Lys Asp Asp Pro Glu Val Gln Phe Ser Trp Phe Val
 275 280 285
 Asp Asp Val Glu Val His Thr Ala Gln Thr Gln Pro Arg Glu Glu Gln
 290 295 300
 Phe Asn Ser Thr Phe Arg Ser Val Ser Glu Leu Pro Ile Met His Gln
 305 310 315 320
 Asp Trp Leu Asn Gly Lys Glu Phe Lys Cys Arg Val Asn Ser Ala Ala
 325 330 335
 Phe Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Arg Pro
 340 345 350
 Lys Ala Pro Gln Val Tyr Thr Ile Pro Pro Pro Lys Glu Gln Met Ala
 355 360 365
 Lys Asp Lys Val Ser Leu Thr Cys Met Ile Thr Asp Phe Phe Pro Glu
 370 375 380
 Asp Ile Thr Val Glu Trp Gln Trp Asn Gly Gln Pro Ala Glu Asn Tyr
 385 390 395 400
 Lys Asn Thr Gln Pro Ile Met Asp Thr Asp Gly Ser Tyr Phe Val Tyr
 405 410 415
 Ser Lys Leu Asn Val Gln Lys Ser Asn Trp Glu Ala Gly Asn Thr Phe
 420 425 430
 Ile Cys Ser Val Leu His Glu Phe Gly Pro Glu Thr Leu Cys Gly Ala
 435 440 445
 Glu Leu Val Asp Ala Leu Gln Phe Val Cys Gly Asp Arg Gly Phe Tyr
 450 455 460
 Phe Asn Lys Pro Thr Gly Tyr Gly Ser Ser Ser Arg Arg Ala Pro Gln
 465 470 475 480
 Thr Gly Ile Val Asp Glu Cys Cys Phe Arg Ser Cys Asp Leu Arg Arg
 485 490 495
 Leu Glu Met Tyr Cys Ala Pro Leu Lys Pro Ala Lys Ser Ala

505

<220>
<223> Fusion protein with N-terminal portion of DAV-1 heavy chain
and EGF mature peptide

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19

<220>
<223> PCR primer for amplification of DAV-1 kappa chain
CL-A.

20

<220>
<223> PCR primer for amplification of DAV-1 kappa chain
CL-B.

20

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<220>  
<221> PEPTIDE  
<222> (0)...(0)  
<223> Peptide spanning integrin binding site on penton base.
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<210> 20
<211> 9
<212> PRT
<213> Adenovirus
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<220>
<221> PEPTIDE
<222> (0)...(0)
<223> Epitope on penton base integrin binding site recognized by DAV-1.
```

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<210> 21
<211> 31
<212> DNA
<213> Artificial Sequence
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<220>
<223> PCR sense primer for subcloning DAV-1 heavy chain for whole antibody or Fab'2 constructs.

<400> 21
 ggtaccgccca ccatgggatg gagctggatc t 31

<210> 22
 <211> 24
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR antisense primer for subcloning DAV-1 heavy chain for whole antibody construct.

<400> 22
 gaattcatgt aacacagagc agga 24

<210> 23
 <211> 35
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR sense primer for subcloning DAV-1 light chain for whole antibody or Fab'2 constructs.

<400> 23
 aagcttgcca ccatggagac agacacaatc ctgct 35

<210> 24
 <211> 28
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR antisense primer for subcloning DAV-1 light chain for whole antibody or Fab'2 constructs.

<400> 24
 tctagatgtc tctaactctc attcctgt 28

<210> 25
 <211> 24
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR antisense primer for subcloning DAV-1 heavy chain for Fab'2 constructs.

<400> 25
 gaattctgat acttctggga ctgt 24

<210> 26
 <211> 26
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR sense primer for subcloning TNF α into DAV-1/TNF α fusion construct.

<400> 26
 gaattcgtca gatcatcttc tcgaac 26

<210> 27
 <211> 26
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> PCR antisense primer for subcloning TNF α into DAV-1/TNF α fusion construct.

 <400> 27 26
 gaattctaca gggcaatgat ccctaaa

 <210> 28
 <211> 26
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> PCR sense primer for subcloning IGF-1 into DAV-1/IGF-1 fusion construct.

 <400> 28 26
 gaattcggac cggagacgct ctgcgg

 <210> 29
 <211> 26
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> PCR antisense primer for subcloning IGF-1 into DAV-1/IGF-1 fusion construct.

 <400> 29 26
 gaattctaag ctgacttggc aggctt

 <210> 30
 <211> 96
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> PCR sense primer for subcloning EGF into DAV-1/EGF fusion construct.

 <400> 30 60
 gaattcaata gtgactctga atgtcccctg tcccacgatg ggtactgcct ccatgatggt 96
 gtgtgcatgt atattgaagc attggacaag tatgca

 <210> 31
 <211> 98
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> PCR antisense primer for subcloning EGF into DAV-1/EGF fusion construct.

 <400> 31 60
 gaattctagc gcagttccca ccacttcagg tctcgggtact gacatcgctc cccgatgtag 98
 ccaacaacac agttgcatgc atacttgtcc aatgcttc

<210> 32
 <211> 27
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR sense primer for subcloning SCF into DAV-1/SCF
 fusion construct.

<400> 32
 gcggccgcaa gggatctgca ggaatcg

27

<210> 33
 <211> 26
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR antisense primer for subcloning SCF into DAV-1/SCF
 fusion construct.

<400> 33
 tctagagtgc aacaggggggt aacata

26